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(54) **METHOD FOR ESTABLISHING A CONNECTION BETWEEN A NODE OF A COMMUNICATION SYSTEM AND A NODE OF A DATA SERVICE NETWORK IN A WIRELESS COMMUNICATION SYSTEM**

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H04W 76/02 (2009.01)

(52) **U.S. Cl.**
CPC ***H04W 76/02*** (2013.01)

(58) **Field of Classification Search**
CPC H04L 45/02; H04W 72/04; H04W 80/04; H04W 8/26
USPC 370/255, 329, 331
See application file for complete search history.

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(57) **ABSTRACT**

A method for establishing a connection between a mobility management entity and a node of a network includes acquiring, at the mobility management entity, an address of the node, transmitting a session creation request from the mobility management entity to a serving gateway, receiving, at the mobility management entity, a session creation response from the serving gateway in response to the session creation request, the session creation response including uplink bearer information for data transmission to the serving gateway and an address allocated to the mobility management entity by a packet data network gateway, transmitting, at the mobility management entity, downlink bearer information for data reception from the serving gateway to the serving gateway, and communicating, at the mobility management entity, with the node using the address of the mobility management entity and the address of the node according to the uplink bearer information and the downlink bearer information.

10 Claims, 7 Drawing Sheets

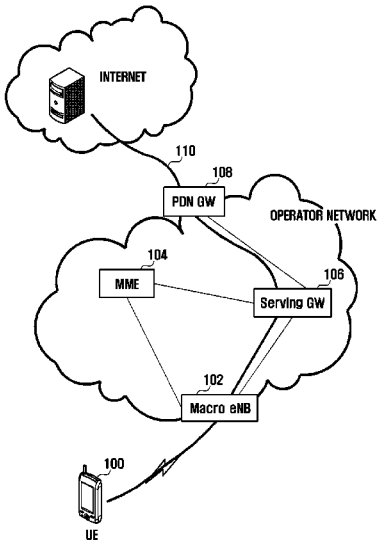

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FIG. 1

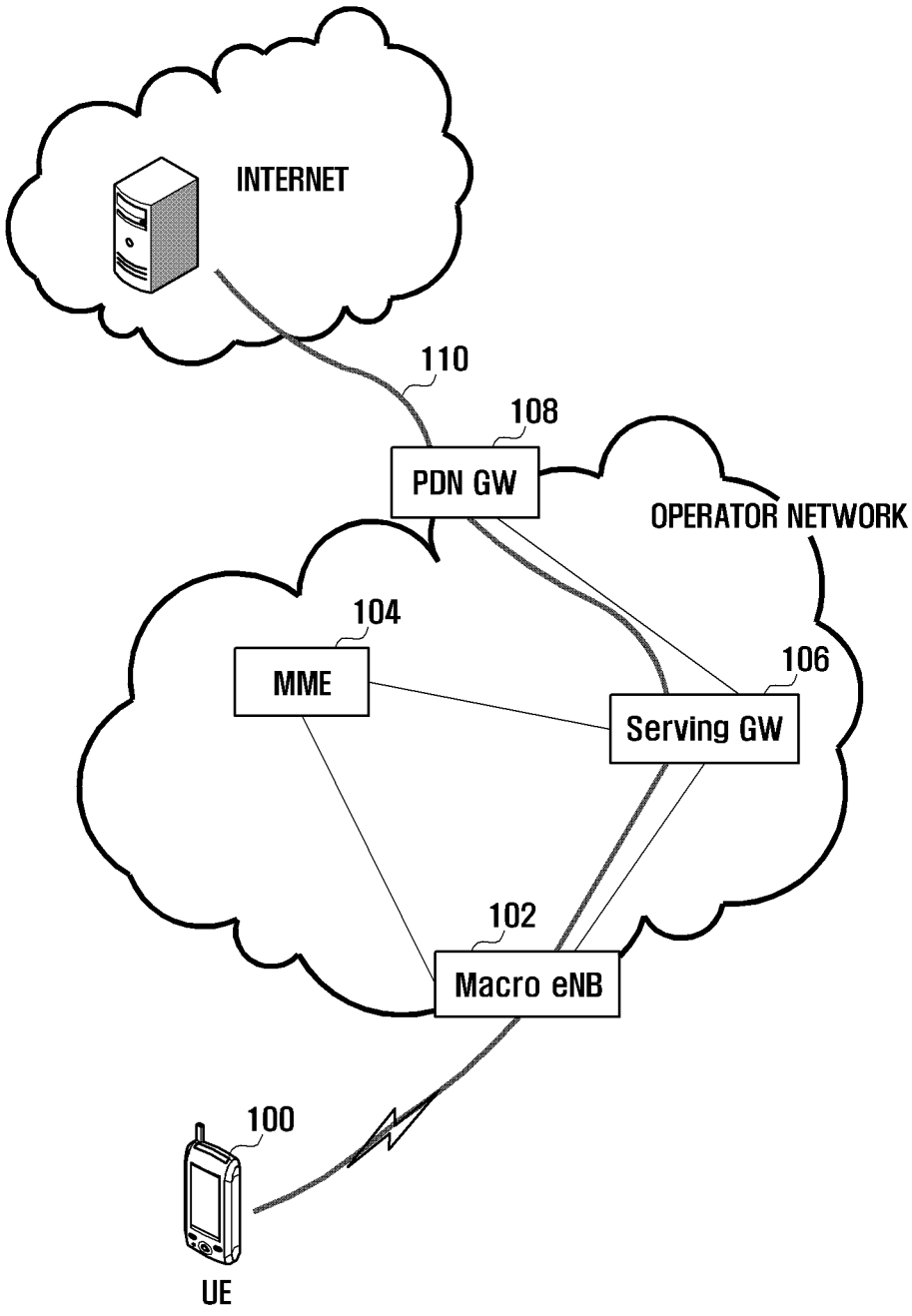

INTERNET
110
108
PDN GW
OPERATOR NETWORK
104
MME
106
Serving GW
102
Macro eNB
100
UE

FIG. 2

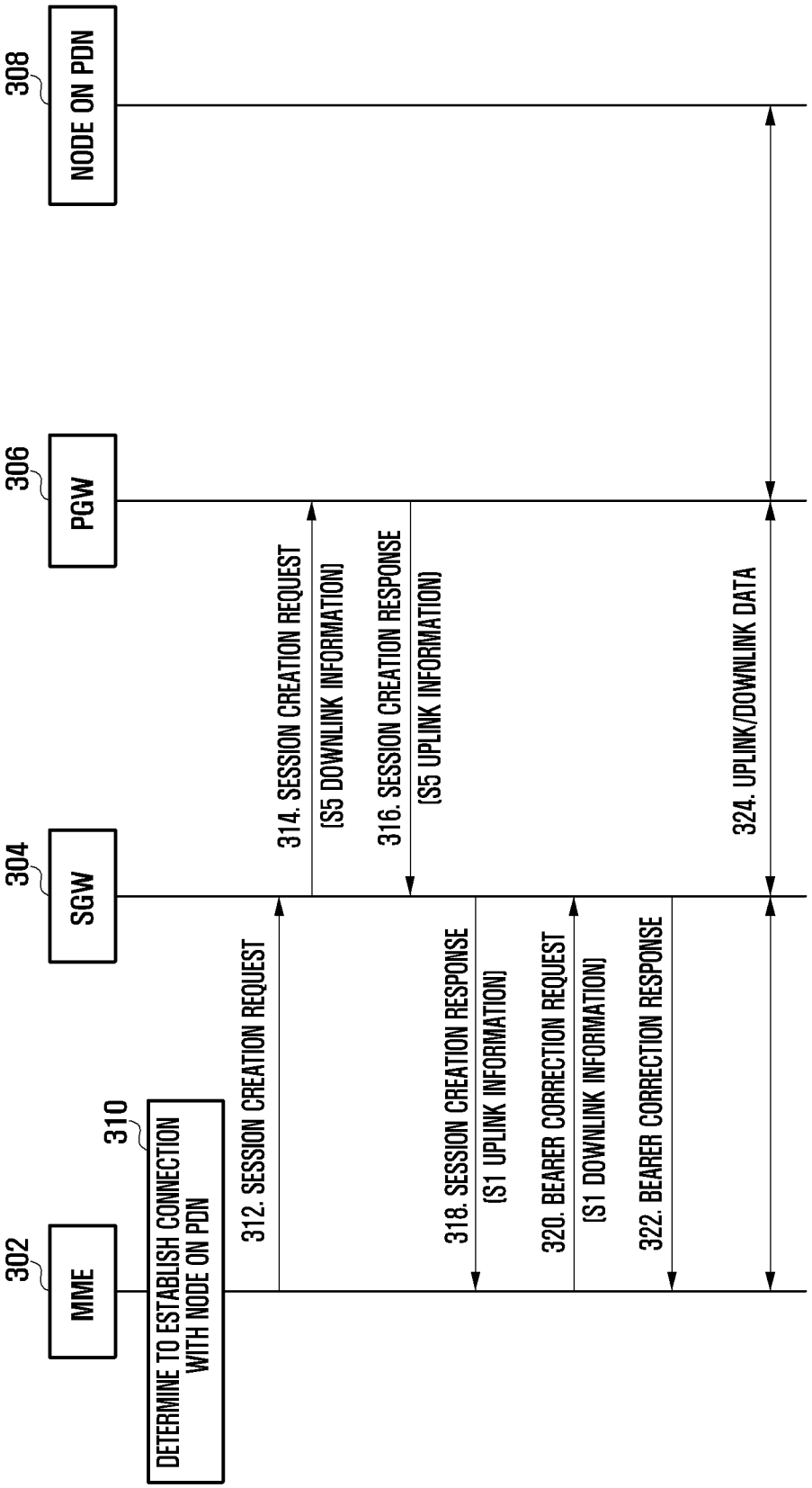

302
MME
304
SGW
306
PGW
308
NODE ON PDN
310
DETERMINE TO ESTABLISH CONNECTION WITH NODE ON PDN
312. SESSION CREATION REQUEST
314. SESSION CREATION REQUEST
(S5 DOWNLINK INFORMATION)
316. SESSION CREATION RESPONSE
(S5 UPLINK INFORMATION)
318. SESSION CREATION RESPONSE
(S1 UPLINK INFORMATION)
320. BEARER CORRECTION REQUEST
(S1 DOWNLINK INFORMATION)
322. BEARER CORRECTION RESPONSE
324. UPLINK/DOWNLINK DATA

FIG. 3

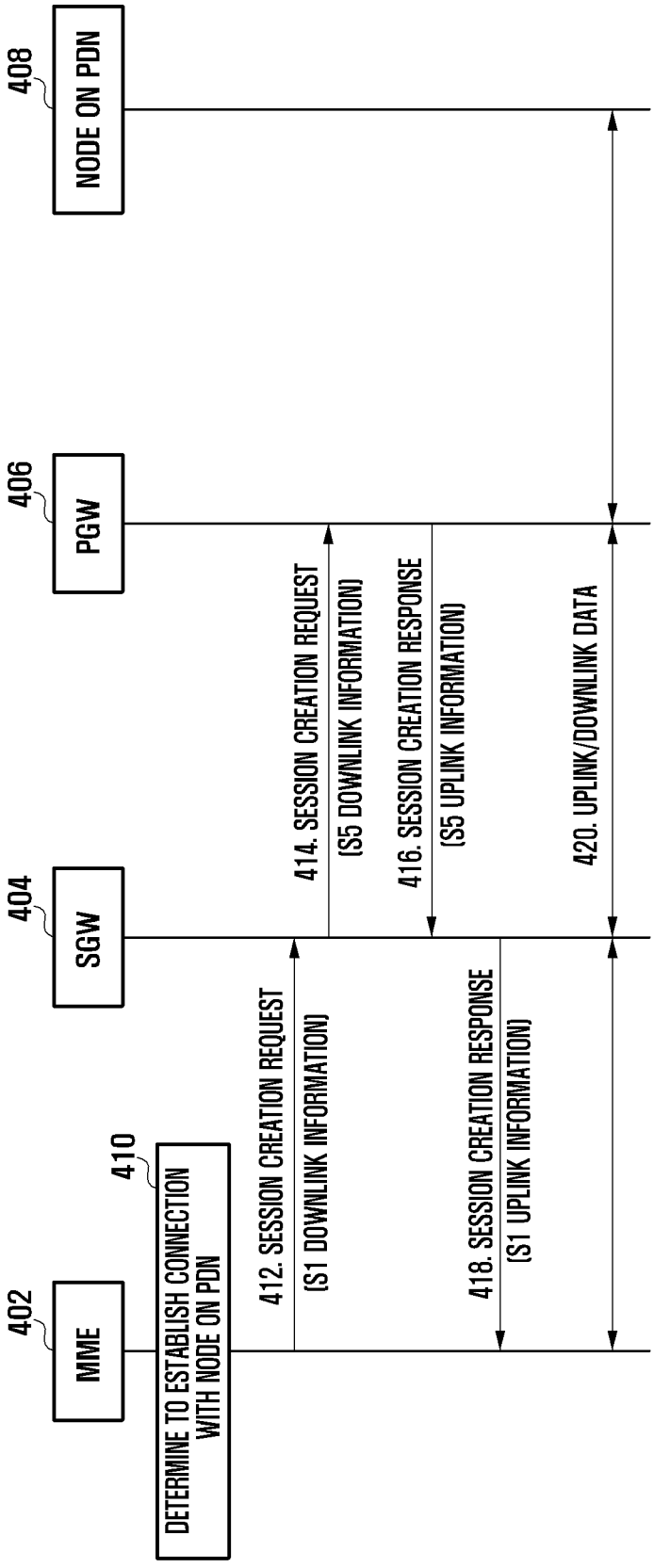

402
MME
404
SGW
406
PGW
408
NODE ON PDN
410
DETERMINE TO ESTABLISH CONNECTION WITH NODE ON PDN
412. SESSION CREATION REQUEST (S1 DOWNLINK INFORMATION)
414. SESSION CREATION REQUEST (S5 DOWNLINK INFORMATION)
416. SESSION CREATION RESPONSE (S5 UPLINK INFORMATION)
418. SESSION CREATION RESPONSE (S1 UPLINK INFORMATION)
420. UPLINK/DOWNLINK DATA

FIG. 4

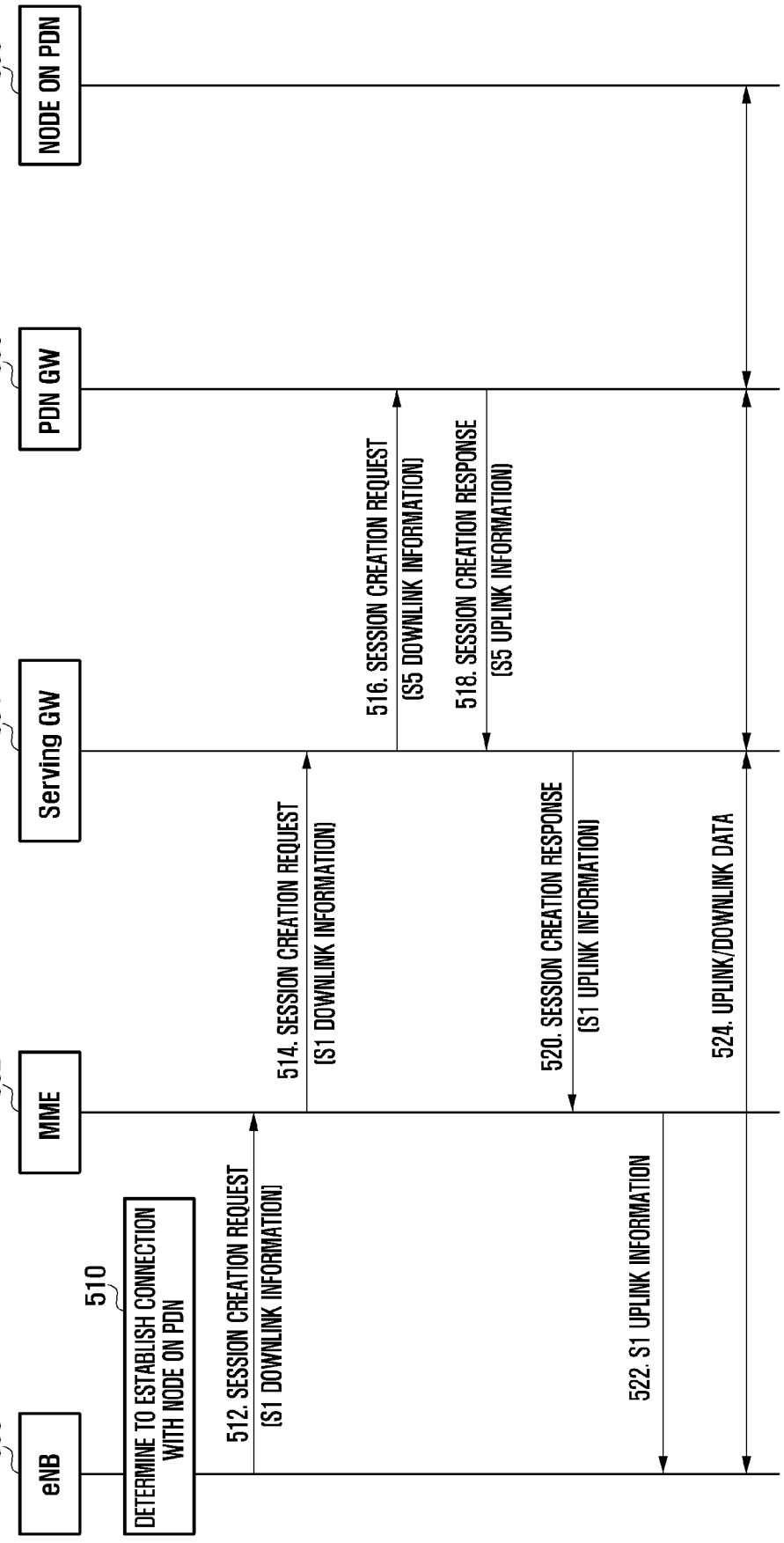

500
eNB
510
DETERMINE TO ESTABLISH CONNECTION WITH NODE ON PDN
502
MME
504
Serving GW
506
PDN GW
508
NODE ON PDN
512. SESSION CREATION REQUEST (S1 DOWNLINK INFORMATION)
514. SESSION CREATION REQUEST (S1 DOWNLINK INFORMATION)
516. SESSION CREATION REQUEST (S5 DOWNLINK INFORMATION)
518. SESSION CREATION RESPONSE (S5 UPLINK INFORMATION)
520. SESSION CREATION RESPONSE (S1 UPLINK INFORMATION)
522. S1 UPLINK INFORMATION
524. UPLINK/DOWNLINK DATA

FIG. 5

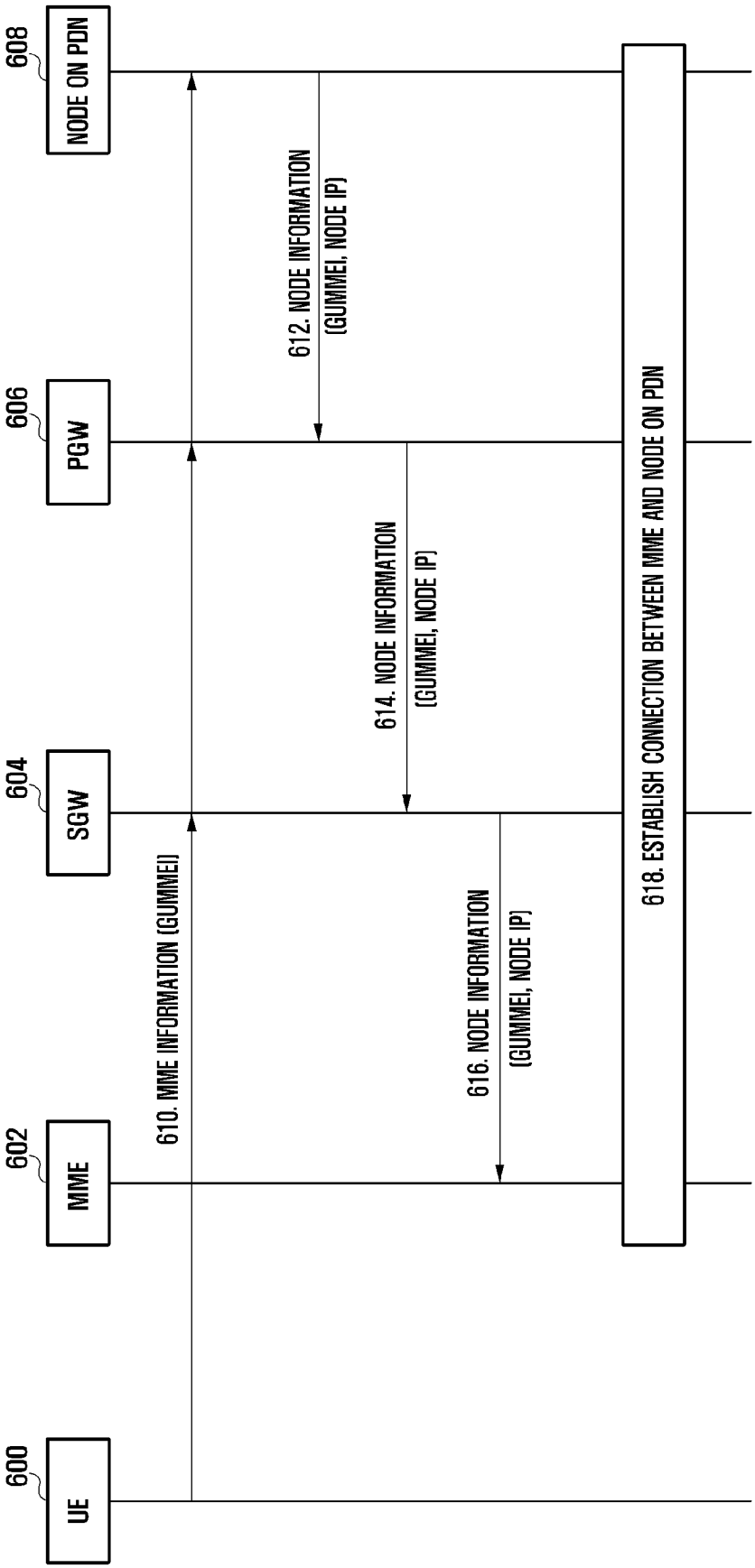

600
UE
602
MME
604
SGW
606
PGW
608
NODE ON PDN
610. MME INFORMATION (GUMMEI)
612. NODE INFORMATION (GUMMEI, NODE IP)
614. NODE INFORMATION (GUMMEI, NODE IP)
616. NODE INFORMATION (GUMMEI, NODE IP)
618. ESTABLISH CONNECTION BETWEEN MME AND NODE ON PDN

FIG. 6

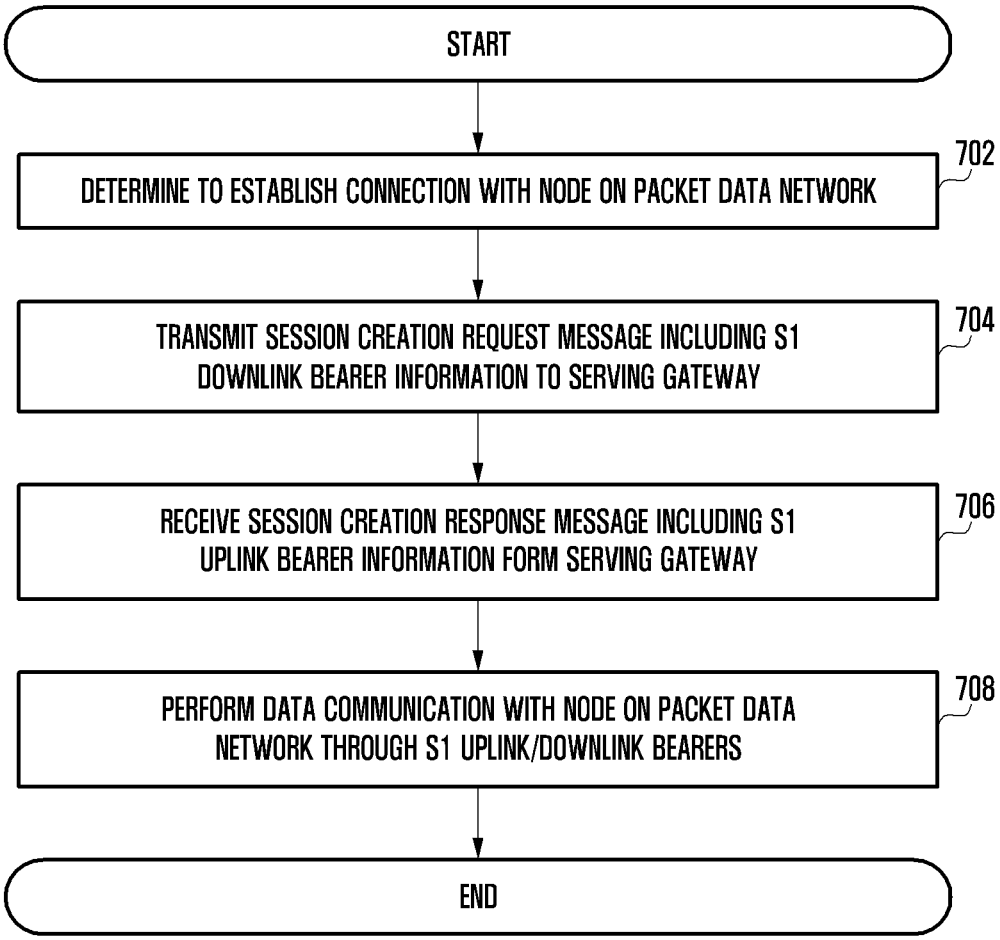
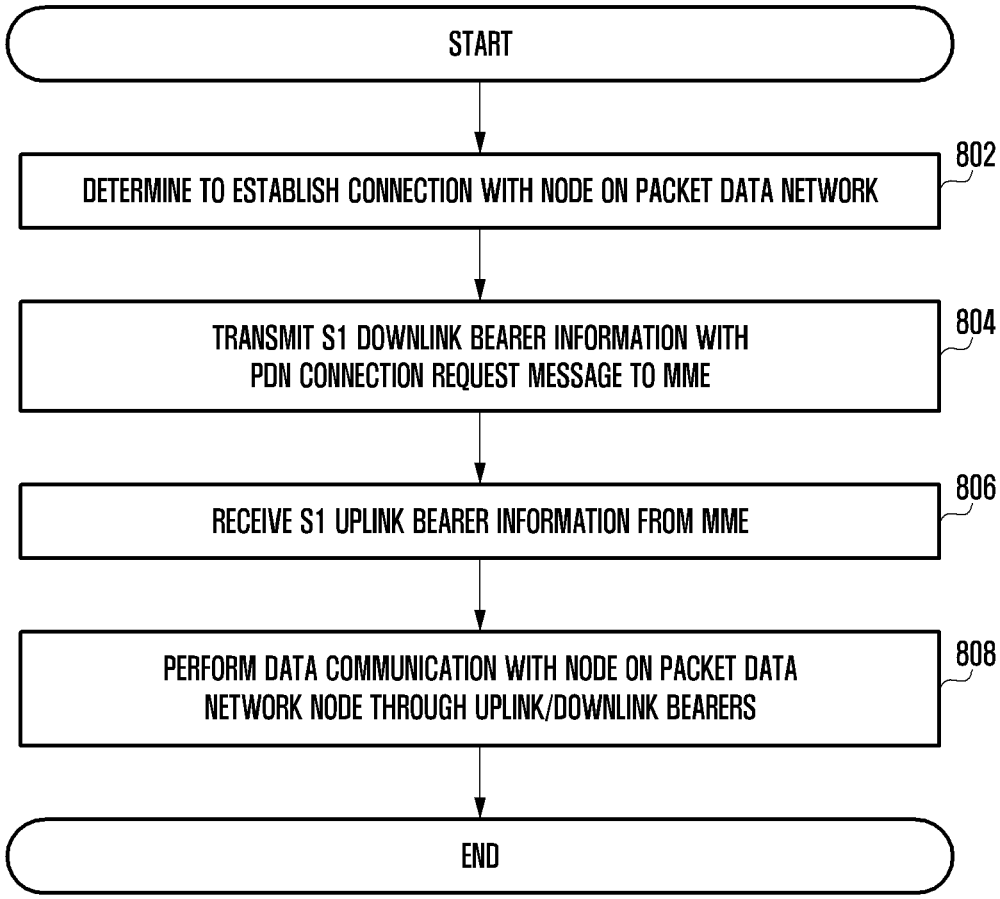

START
DETERMINE TO ESTABLISH CONNECTION WITH NODE ON PACKET DATA NETWORK
702
TRANSMIT SESSION CREATION REQUEST MESSAGE INCLUDING S1 DOWNLINK BEARER INFORMATION TO SERVING GATEWAY
704
RECEIVE SESSION CREATION RESPONSE MESSAGE INCLUDING S1 UPLINK BEARER INFORMATION FORM SERVING GATEWAY
706
PERFORM DATA COMMUNICATION WITH NODE ON PACKET DATA NETWORK THROUGH S1 UPLINK/DOWNLINK BEARERS
708
END

FIG. 7


START
DETERMINE TO ESTABLISH CONNECTION WITH NODE ON PACKET DATA NETWORK
802
TRANSMIT S1 DOWNLINK BEARER INFORMATION WITH PDN CONNECTION REQUEST MESSAGE TO MME
804
RECEIVE S1 UPLINK BEARER INFORMATION FROM MME
806
PERFORM DATA COMMUNICATION WITH NODE ON PACKET DATA NETWORK NODE THROUGH UPLINK/DOWNLINK BEARERS
808
END

METHOD FOR ESTABLISHING A CONNECTION BETWEEN A NODE OF A COMMUNICATION SYSTEM AND A NODE OF A DATA SERVICE NETWORK IN A WIRELESS COMMUNICATION SYSTEM

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a mobile communication system and method and, in particular, to a method for establishing a connection between a communication system node and a data service network node in the mobile communication system.

2. Description of the Related Art

Typically, Universal Mobile Telecommunication System (UMTS) is a 3rd Generation mobile communication systems based on Wideband Code Division Multiple Access (WCDMA) evolved from Global System for Mobile communications (GSM) and General Packet Radio Service (GPRS). The 3rd Generation Partnership Project (3GPP) for standardization of UMTS proposes the next generation communication system (Evolved Packet System; EPS) such as Long Term Evolution (LTE) system. LTE is a technology for implementing the high speed packet-based communication.

The current system is inefficient in that the operator has to participate, whenever necessary, in establishing an IP connection between a user data network node and communication system node. There is therefore a need of a method for establishing a connection between the user data network node and a communication system node automatically and efficiently.

DISCLOSURE OF INVENTION

Technical Problem

The present invention has been made in an effort to solve the above problem, and it is an object of the present invention to provide a method and apparatus for establishing a connection between a user data network node and a communication system node efficiently.

Solution to Problem

In accordance with an aspect of the present invention, a method for establishing a connection between a mobility management entity and a node of a network includes acquiring, at the mobility management entity, an address of the node; transmitting a session creation request from the mobility management entity to a serving gateway; receiving, at the mobility management entity, a session creation response from the serving gateway in response to the session creation request, the session creation response including uplink bearer information for data transmission to the serving gateway and an address allocated to the mobility management entity by a packet data network gateway; transmitting, at the mobility management entity, downlink bearer information for data reception from the serving gateway to the serving gateway; and communicating, at the mobility measurement entity, with the node using the address of the mobility management entity and the address of the node according to the uplink bearer information and the downlink bearer information.

In accordance with another aspect of the present invention, a method for establishing a connection between a base station and a node of a network acquiring, at the base station, an identification address of the node; transmitting, at the base station, a session creation request to a mobility management entity; receiving, at the base station, a session creation response from the mobility management entity in response to the session creation request, the session creation response including uplink bearer information for data transmission to the mobility management entity and an address allocated to the base station by a packet data network gateway; transmitting downlink bearer information from the base station to the mobility management entity for the eNB to receive data from the mobility management entity; and communicating, at the base station, with the node using the identification address of the base station and the identification address of the node according to the uplink bearer information and the downlink bearer information.

In accordance with still another aspect of the present invention, a communication system for configuring a connection between a mobility management entity and a node of a network includes a packet data network gateway which allocates an identification address to the mobility management entity upon receipt of a session creation request (Create Session Request) and transmits to a serving gateway a session creation response including the identification address and uplink bearer information for data communication to the packet data network gateway; a serving gateway which delivers the session creation request received from the mobility management entity to the packet data network gateway and delivers the session creation response received from the packet data network gateway to the mobility management entity; and a mobility management entity which acquires, the identification address of the node, transmits the session creation request to the serving gateway, receives the session creation response from the serving gateway in response to the session creation request—the session creation response includes uplink bearer information for data transmission to the serving gateway and the identification address allocated to the mobility management entity by the packet data network gateway—, transmits to the serving gateway the downlink bearer information for data reception from the serving gateway, and communicates with the node using the identification address of the mobility management entity and the identification address of the node according to the uplink bearer information and the downlink bearer information.

Detailed features of other embodiments will be provided in the following section of the detailed descriptions and the drawings.

Advantageous Effects

The present invention is advantageous in establishing a connection between a user data network node and a communication system node efficiently.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a block diagram illustrating a mobile communication system according to an embodiment of the present invention.

FIG. **2** is signal flow diagram illustrating a procedure of establishing a connection between the MME **302** and a data network node **308** according to the first embodiment of the present invention.

FIG. **3** is a signal flow diagram illustrating a procedure for establishing a connection between the MME **402** and the data network node **408** according to the second embodiment of the present invention.

FIG. **4** is a signal flow diagram illustrating a procedure for establishing a connection between the eNB **500** and the data network nod e **508** according to the third embodiment of the present invention.

FIG. **5** is a signal flow diagram illustrating a procedure of transferring an identification address of the node **608** on the data network from the node **608** to the MME **602** according to the fourth embodiment of the present invention.

FIG. **6** is a flowchart illustrating an operation procedure of the MME **402** according to the second embodiment of the present invention.

FIG. **7** is a flowchart illustrating an operation procedure of the eNB **500** according to the third embodiment of the present invention.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

Exemplary embodiments of the present invention are described with reference to the accompanying drawings in detail. The same reference numbers are used throughout the drawings to refer to the same or like parts. Detailed description of well-known functions and structures incorporated herein may be omitted to avoid obscuring the subject matter of the present invention.

FIG. **1** is a block diagram illustrating a mobile communication system according to an embodiment of the present invention. Referring to FIG. **1**, the mobile communication system according to an embodiment of the present invention includes a Macro enhanced Node B (Macro eNB) **102**, a Mobility Management Entity (MME), a Serving Gateway (S-GW) **106**, a Packet Data Network Gateway (P-GW) **108**, and a User Equipment (UE) **100**.

The Macro eNB **102** is the eNB in charge of a macro cell. Although the macro cell is a normal cell of a cellular system and the macro eNB **102** is an eNB which manages and controls the macro cell, the terms 'macro cell' and 'macro eNB' may be interchangeably used in the present invention for the convenience sake. In the following description, the macro eNB **102** is also referred to as eNB **102**.

The macro eNB **102** establishes a radio channel with the UE **100** and controls the radio resource. For example, the macro eNB **102** is capable of generating and broadcasting control information necessary within the macro cell and allocating radio resource for communicating data and control signal with the UE **100**. At this time, the broadcast system information includes PLMN ID as the information on the operator supported by the eNB, eNB Cell Global ID (ECGI) as eNB cell information, Tracking Area ID as information on the area to which each cell belongs, etc. also, the macro eNB **102** is capable of collecting channel measurement result information of the current cell and neighbor cells from the UE **100** and analyses this information to determine and command handover. In order to accomplish this, the macro eNB **102** is provided with the control protocol such as radio resource management-related Radio Resource Control Protocol.

The MME **104** manages the UE in the idle mode and selects the P-GW and S-GW **106**. The MME **104** is also capable of performing the functions related to Roaming and Authentication. The MME **104** also processes the bearer signal generated by the UE **100**. Typically, the message exchanged between the MME **104** and the UE **100** is referred to as Non-Access Stratum (NAS) message.

When the UE performs handover between macro eNBs or roams across the 3GPP radio networks such as LTE and UMTS/GSM, the S-GW **106** works as the mobility anchor.

The P-GW **108** allocates Internet Protocol (IP) address to the UE **100**, performs packet data-related function of the core network, and works as a mobility anchor for roaming across 3GPP and non-3GPP radio networks. The P-GW **108** also determines the bearer band for a subscriber and is responsible for packet data forwarding and routing functions.

Typically, S1-MME interface is defined between the eNB **102** and the MME **104**, and S1-U interface between the eNB **102** and the S-GW **106**, and S5 interface between the S-GW **106** and the P-GW **108**.

In addition, the Home Subscriber Server (HSS) (not shown) stores subscription information per UE and, when the UE **100** connects to the network, sends the UE information to the MME **104** in order for the MME **104** to control the UE **100**.

When it has attached to the macro eNB **102**, the UE **100** accesses the data network through the data transfer paths established via the macro eNB **102**, S-GW **106**, and P-GW **108**.

Typically, in the radio communication network, the UE **100** establishes the connection with the macro eNB **102** and then transmits a NAS Request message to the MME **104**. At this time, the NAS Request message can be any of Attach Request, Tracking Area Update Request, and Service Request messages.

In order to provide various communication services in the radio communication system, it is necessary for the node on a user data network and the node on a communication system network to communicate with each other.

In an exemplary case of the Machine type communication system, it is necessary to support communication between the machine type communication server placed on the user data network and the mobility management entity (or eNB) of the communication system for controlling the machine type communication terminal (sensor or metering device). This is because it is advantageous to exchange the policy or report related to the machine type communication terminal control between the machine type communication server and the MME (or eNB) from the view point of network management efficiency.

FIG. **2** is signal flow diagram illustrating a procedure of establishing a connection between the MME **302** and a data network node **308** according to the first embodiment of the present invention.

Referring to FIG. **2**, the MME **302** determines to establish a connection with the node **308** on the data network at step **310**. The MME **302** is a node of the radio communication system as described with reference to FIG. **1**. At this time, the MME **302** is capable of retaining the address (e.g. IP address) of the node **308** for establishing the data network node **308**. The address of the data network node **308** can be transferred to the MME **302** by the UE, HSS, or other entity.

For example, the MME **302** is capable of determining establishment of a connection with the data network node **308** to exchange the UE control policy or report.

The MME **302** requests the S-GW **304** to generate a new S1-U bearer at step **312** and, upon receipt of the request, the S-GW **304** requests the P-GW **306** to generate a downlink S5 bearer along with the downlink S5 bearer information at step **314**. The P-GW **306** transmits to the S-GW **304** a response message in response to the bearer generation request of step **314** along with the uplink S5 bearer information at step **316**. The P-GW **306** is also capable of allocating an address, e.g. IP address, to the MME **302**. The response message of step **316** may include the address allocated to the MME **302**. The S-GW **304** transmits to the MME **302** a response message in response to the S1-U bearer generation request of step **312**

along with the address which the P-GW **306** has allocated to the MME **302** at step **318**. The MME **304** delivers the downlink S1-U bearer information to the S-GW **304** at step **320** and receives a response in reply to the request of **320** at step **322**. Accordingly, the MME **302** is capable of communicating data with the data network node **308** via S1 bearer—S-GW **304**-S5 bearer—P-GW **306** at step **324**. In this data communication, the identification address of the node **308** and the identification address which the P-GW **306** has allocated to the MME **302** are used. That is, the node **308** and the MME **302** communicate with each other using the identification address of the node **308** and the identification address of the MME **302**.

FIG. **3** is a signal flow diagram illustrating a procedure for establishing a connection between the MME **402** and the data network node **408** according to the second embodiment of the present invention.

Referring to FIG. **3**, the MME **402** determines to establish a connection with the node **408** of the data network at step **410**. The MME **402** is a node of the mobile communication system as described with reference to FIG. **1**. At this time, the MME **402** is capable of retaining the address (e.g. IP address) of the node **408** for establishing the connection with the data network node **408**. The address of the data network node **408** can be transferred to the MME **402** by the UE, HSS, or other entity.

For example, the MME **402** is capable of determining establishment of a connection with the data network node **408** to exchange the UE control policy or report.

The MME **402** requests the S-GW **404** to generate a new S1-U bearer with S1-U bearer information at step **412** and, upon receipt of the request, the S-GW **404** requests the P-GW **406** to generate a downlink S5 bearer with the downlink S5 bearer information at step **414**. The P-GW **406** transmits to the S-GW **404** a response message in response to the bearer generation request of step **414** along with the uplink S5 bearer information at step **416**. The P-GW **406** is also capable of allocating an address, e.g. IP address, to the MME **402**. The response message of step **416** is capable of including the address which the P-GW **406** has allocated to the MME **402**. The S-GW **404** transmits to the MME **302** a response message in response to the S1-U bearer generation request of step **412** along with the uplink S1-U bearer information and the address which the P-GW **406** has allocated to the MME **402** at step **418**. Accordingly, the MME **402** is capable of communicating data with the data network node **408** via S1 bearer—S-GW **304**-S5 bearer—P-GW **306** at step **420**. In this data communication, the identification address of the node **408** and the identification address which the P-GW **406** has allocated to the MME **402** are used. That is, the node **408** and the MME **402** communicate with each other using the identification address of the node **408** and the identification address of the MME **402**.

FIG. **4** is a signal flow diagram illustrating a procedure for establishing a connection between the eNB **500** and the data network nod e **508** according to the third embodiment of the present invention.

Referring to FIG. **4**, the eNB **500** determines to establish a connection with the node **508** on the data network at step **510**. The eNB **500** is a node of the mobile communication system as described with reference to FIG. **1**. At this time, the eNB **500** is capable of retaining the address (e.g. IP address) of the node **508** for establishing the connection with the data network node **508**. The address of the node **508** can be transferred to the eNB **500** by the UE, HSS, or other entity.

The eNB **500** is capable of determining the connection with the data network node **508** to exchange the UE control policy or report.

The eNB **500** transmits a PDN connection request message to the MME **502** along with the downlink S1-U information at step **512**. The MME **502** requests the S-GW **504** to generate a new S1-U bearer with the downlink S1-U bearer information and, upon receipt of the request at step **514**, the S-GW **504** requests the P-GW **506** to generate a new S5 bearer with the downlink S5 bearer information at step **516**. The P-GW **506** transmits a response message to the S-GW **504** in response to the bearer generation request of step **516** along with the uplink S5 bearer information at step **518**. The P-GW **506** allocates an address, e.g. IP address, to the eNB **500**. The response message of step **518** includes the address which the P-GW **506** has allocated to the eNB **500**. The S-GW **504** transmits a response message to the MME **502** along with the uplink S1-U bearer information and the address which the P-GW **506** has allocated to the eNB **500** in response to the S1-U bearer generation request of step **514** at step **520**. The MME **504** transmits to the eNB **522** the uplink S1-U bearer information along with the address which the P-GW **506** has allocated to the eNB **500**. Accordingly, the eNB **500** is capable of communicating data with the data network node **508** via S1 bearer—S-GW **504**-S5 bearer—P-GW **506** at step **524**. In this data communication, the identification address of the node **508** and the identification address which the P-GW **506** has allocated to the eNB **500** are used. That is, the node **508** and the eNB **500** communicate with each other using the identification address of the node **508** and the identification address of the eNB **500**.

FIG. **5** is a signal flow diagram illustrating a procedure of transferring an identification address (e.g. IP address) of the node **608** on the data network from the node **608** to the MME **602** according to the fourth embodiment of the present invention.

Referring to FIG. **5**, the UE **600** connected to the data network transmits Global Unique MME ID (GUMMEI) to the node **608** on the data network at step **610**. The data network node **608** transmits its own information and the MME information to the P-GW **606**. At this time, a Policy & Charging Rule Function (PCRF) (not shown) or an Application Function (AF) (not shown) may participate in the node information message transfer between the node **608** and the P-GW **606**, if necessary. The P-GW **606** transmits the node information to the S-GW **604** at step **614**, and the S-GW **604** delivers the node information, as indicated, to the MME **602** at step **614**. Finally, the MME **602** is capable of establishing the connection with the data network node **608** according to the first or second embodiment of the present invention at step **618**.

FIG. **6** is a flowchart illustrating an operation procedure of the MME **402** according to the second embodiment of the present invention. Referring to FIG. **6**, the MME **402** determines to establish a connection with the data network at step **702**. The MME **402** transmits the session creation request message including downlink S1-U bearer information to the S-GW **404** at step **704**. The MME **402** receives a session creation response message including uplink S1-U bearer information from the S-GW **404** at step **706**. Finally, the MME **402** performs data communication with the data network node **408** through uplink/downlink S1-U bearer at step **708**.

FIG. **7** is a flowchart illustrating an operation procedure of the eNB **500** according to the third embodiment of the present invention. Referring to FIG. **7**, the eNB **500** determines to establish a connection with the data network at step **802**. The eNB **500** transmits a PDN connection request message including downlink S1-U bearer information to the MME **502** at step **804**. The eNB **500** receives the uplink S1-U bearer

information form the MME **502**. Finally, the eNB **500** performs data communication with the data network node through the uplink/downlink S1-U bearer at step **808**.

The specification and drawings are to be regarded in an illustrative rather than a restrictive sense in order to help understand the present invention. It is obvious to those skilled in the art that various modifications and changes can be made thereto without departing from the broader spirit and scope of the invention.

It will be understood that each block of the flowchart illustrations and/or block diagrams, and combinations of blocks in the flowchart illustrations and/or block diagrams, can be implemented by computer program instructions. These computer program instructions may be provided to a processor of a general purpose computer, special purpose computer, or other programmable data processing apparatus to produce a machine, such that the instructions, which execute via the processor of the computer or other programmable data processing apparatus, create means for implementing the functions/acts specified in the flowchart and/or block diagram block or blocks. These computer program instructions may also be stored in a computer-readable memory that can direct a computer or other programmable data processing apparatus to function in a particular manner, such that the instructions stored in the computer-readable memory produce an article of manufacture including instruction means which implement the function/act specified in the flowchart and/or block diagram block or blocks. The computer program instructions may also be loaded onto a computer or other programmable data processing apparatus to cause a series of operational steps to be performed on the computer or other programmable apparatus to produce a computer implemented process such that the instructions which execute on the computer or other programmable apparatus provide steps for implementing the functions/acts specified in the flowchart and/or block diagram block or blocks.

Furthermore, the respective block diagrams may illustrate parts of modules, segments or codes including at least one or more executable instructions for performing specific logic function(s). Moreover, it should be noted that the functions of the blocks may be performed in different order in several modifications. For example, two successive blocks may be performed substantially at the same time, or may be performed in reverse order according to their functions.

The term "module" according to the embodiments of the invention, means, but is not limited to, a software or hardware component, such as a Field Programmable Gate Array (FPGA) or Application Specific Integrated Circuit (ASIC), which performs certain tasks. A module may advantageously be configured to reside on the addressable storage medium and configured to be executed on one or more processors. Thus, a module may include, by way of example, components, such as software components, object-oriented software components, class components and task components, processes, functions, attributes, procedures, subroutines, segments of program code, drivers, firmware, microcode, circuitry, data, databases, data structures, tables, arrays, and variables. The functionality provided for in the components and modules may be combined into fewer components and modules or further separated into additional components and modules. In addition, the components and modules may be implemented such that they execute one or more CPUs in a device or a secure multimedia card.

Industrial Applicability

The foregoing disclosure has been set forth merely to illustrate the invention and is not intended to be limiting. Since modifications of the disclosed embodiments incorporating the spirit and substance of the invention may occur to persons skilled in the art, the invention should be construed to include everything within the scope of the appended claims and equivalents thereof.

What is claimed is:

1. A method for establishing a connection between a mobility management entity and a node of a network by the mobility management entity, the method comprising: acquiring an address of the node; transmitting a session creation request to a serving gateway; receiving a session creation response from the serving gateway in response to the session creation request, the session creation response including uplink bearer information for transmitting data to the serving gateway and an address allocated to the mobility management entity by a packet data network gateway; transmitting, to the serving gateway, downlink bearer information for receiving data from the serving gateway; and transmitting and receiving data with the node based on the address of the mobility management entity and the address of the node using a bearer between the mobility management entity and the serving gateway created based on the uplink bearer information and the downlink bearer information, wherein each of the addresses is an Internet Protocol (IP) address.

2. The method of claim **1**, wherein the downlink bearer information is transmitted to the serving gateway along with the session creation request.

3. The method of claim **1**, wherein acquiring the address of the node comprises acquiring the address of the node from the node which has transmitted identity information of the mobility measurement entity.

4. The method of claim **1**, further comprising:

transmitting, at the serving gateway receiving the session creation request, the session creation request including downlink bearer information for receiving data from the packet data network gateway to the packet data network gateway; and

allocating, at the packet data network gateway received the session creation request, the address to the mobility management entity, and transmitting to the serving gateway the session creation response including the address of the mobility management entity and the uplink bearer information for receiving data from the serving gateway.

5. A method for establishing a connection between a mobility management entity and a node of a network by a serving gateway, comprising: receiving a session creation request from the mobility management entity; transmitting, to a packet data network gateway, the session creation request including downlink bearer information for receiving data from the packet data network gateway; receiving, from the packet data network gateway in response to the session creation request, a session creation response including an address of the mobility management entity allocated by the packet data network gateway and uplink bearer information for transmitting data to the packet data network gateway; transmitting, to the mobility management entity, the session creation response including uplink bearer information for receiving data from the mobility management entity and the address allocated to the mobility management entity by the packet data network gateway; receiving, from the mobility management entity, downlink bearer information for transmitting data to the mobile management entity; and transmitting and receiving data between the mobility management entity and the node based on the address of the mobility management entity and an address of the node which is acquired by the mobility management entity, using a first bearer between the mobility management entity and the serving gateway and a second bearer between the serving gateway

and the packet data network gateway, wherein the first and second bearers are created based on the uplink bearer information and the downlink bearer information, and wherein each of the addresses is an Internet Protocol (IP) address.

6. A method for establishing a connection between a mobility management and a node of a network by a packet data network gateway, comprising: receiving, from a serving gateway, a session creation request including downlink bearer information for transmitting data to the serving gateway; allocating an address to the mobility management entity; transmitting, to the serving gateway in response to the session creation request, a session creation response including the address of the mobility management entity and uplink bearer information for receiving data from the serving gateway; and transmitting and receiving data between the mobility management entity and the node based on the address of the mobility management entity and an address of the node which is acquired by the mobility management entity, using a bearer created based on the uplink bearer information and the downlink bearer information, wherein each of the addresses is an Internet Protocol (IP) address.

7. A mobility management entity comprising: a transceiver for transmitting and receiving signal; and a controller controlled for acquiring an address of a node of a network, for transmitting a session creation request to a serving gateway, for receiving a session creation response from the serving gateway in response to the session creation request, the session creation response including uplink bearer information for transmitting data to the serving gateway and an address allocated to the mobility management entity by a packet data network gateway, for transmitting, to the serving gateway, downlink bearer information for receiving data from the serving gateway, and for transmitting and receiving data with the node based on the address of the mobility management entity and the address of the node using a bearer between the mobility management entity and the serving gateway created based on the uplink bearer information and the downlink bearer information, wherein each of the addresses is an Internet Protocol (IP) address.

8. The mobility management entity of claim **7**, the controller is controlled for transmitting the downlink bearer information along with the session creation request.

9. A serving gateway comprising: a transceiver for transmitting and receiving signal; and a controller controlled for receiving a session creation request from a mobility management entity, for transmitting, to a packet data network gateway, the session creation request including downlink bearer information for receiving data from the packet data network gateway, for receiving, from the packet data network gateway in response to the session creation request, a session creation response including an address of the mobility management entity allocated by the packet data network gateway and uplink bearer information for transmitting data to the packet data network gateway, for transmitting, to the mobility management entity, the session creation response including uplink bearer information for receiving data from the mobility management entity and the address allocated to the mobility management entity by the packet data network gateway, for receiving, from the mobility management entity, downlink bearer information for transmitting data to the mobile management entity, and for transmitting and receiving data between the mobility management entity and a node of a network based on the address of the mobility management entity and an address of the node which is acquired by the mobility management entity, using a first bearer between the mobility management entity and the serving gateway and a second bearer between the serving gateway and the packet data network gateway, wherein the first and second bearer are created based on the uplink bearer information and the downlink bearer information, and wherein each of the addresses is an Internet Protocol (IP) address.

10. A packet data network gateway comprising: a transceiver for transmitting and receiving signal; and a controller controlled for receiving, from a serving gateway, a session creation request including downlink bearer information for transmitting data to the serving gateway, for allocating an address to a mobility management entity, for transmitting, to the serving gateway in response to the session creation request, a session creation response including the address of the mobility management entity and uplink bearer information for receiving data from the serving gateway, and for transmitting and receiving data between the mobility management entity and a node of a network based on the address of the mobility management entity and an address of the node which is acquired by the mobility management entity, using a bearer created based on the uplink bearer information and the downlink bearer information, wherein each of the addresses is an Internet Protocol (IP) address.

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